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CHANGES IN TRACE ELEMENTS AND VITAMINS IN CANCER PATIENTS

Akhmatova Gulrukh Rakhmatovna
Bukhara State Medical Institute

Resume: This article will contain a number of indicators of vitamins and trace elements that are detected in cancer patients at all stages and which can serve as a predictor of diseases. And it will also answer questions such as how to clarify the level at an unspecified stage of cancer processes. The relationship between a certain type of cancer cell and vitamins and trace elements. Having found answers to these questions, we can think about cancer prevention and how to prevent this disease.

Keywords: cancer cell, vitamins, trace elements.

Introduction: High intake of fresh fruits and vegetables has been shown to contribute to cancer prevention. Epidemiological studies confirm that carotene, vitamins A, C, E and selenium are the active compounds. Antioxidant properties and direct effects (eg, inhibition of N-nitrosamine formation or cell-cell interactions) are used. The role of other micronutrients is less clear. Modulation of immune function by vitamins and micronutrients remains important and affects survival. In established cancers, differences in diet and cancer profile depending on the site require appropriate dietary modifications, eg, low fat (20% of calories) in breast cancer or high intake of vegetables or fruits in lung cancer. Acute high-dose supplementation (eg, vitamin C) has not been shown to have a therapeutic or life-prolonging effect. Chemotherapy and radiation increase the need for antioxidant compounds. Supplementation may reduce the damage caused by lipid peroxidation. Well-designed and controlled studies are needed to determine the optimal micronutrient intake as adjuvant therapy in cancer patients [13].

As cancer is a genetic multifactorial disease, there are several aspects that need to be studied and analyzed in terms of cancer susceptibility, progression, and prognosis. One such multivariate factor that has attracted increasing attention in the field of oncology due to its unclear role in assessing cancer risk is diet. Moreover, as research advances, quantifiable links between diet and molecular changes in patients are becoming evident, replacing the old common understanding that links specific phenotypic changes to different nutrient intakes. Accordingly, there are two main fields that study the relationship between the genome and nutrition: nutrigenetics and nutrigenomics. Nutrigenetics studies the effects of nutrition at the gene level, while nutrigenomics studies the effects of nutrients on the structure of the genome and transcriptome. By accurately assessing the relationship between the genomic profile of patients and their nutrient intake, it is possible to develop a concept of personalized medicine that covers nutrition and health care. The list of nutrients that may have an inhibitory effect on cancer development is quite extensive, and there is evidence for this in the scientific literature. Administration of these nutrients has shown significant in vitro and in vivo results in cancer inhibition, although more studies are needed regarding the use of effective doses in real patients [5].

Circulating concentrations of antioxidant vitamins (retinol, alpha-tocopherol, lutein, lycopene, alpha- and beta-carotene) and trace elements (zinc, copper, iron and selenium), as well as carrier proteins (albumin,

transferrin, ceruloplasmin) in patients with gastrointestinal cancer (n = 12) with an inflammatory response (as demonstrated by an increased concentration of C-reactive protein) were compared with the control group (n = 12). In addition, the effect of reducing the inflammatory response with the anti-inflammatory drug ibuprofen on these parameters was studied in a group of cancer patients. The control and cancer groups were similar for age, sex, and body mass index. However, C-reactive protein concentrations were significantly higher in the cancer group. Concentrations of antioxidant vitamins and trace elements (and transport proteins) were significantly lower, with the exception of copper (ceruloplasmin), which was significantly higher. After anti-inflammatory treatment, there was a small but significant increase in lutein, lycopene, and beta-carotene, as well as iron and selenium, while ceruloplasmin levels decreased. Micronutrient concentrations remained different in cancer patients than in controls. These results support the concept that the degree of inflammation plays an important role in regulating circulating concentrations of antioxidant vitamins and trace elements in patients with gastric cancer [8].

The "SUpplementation en Vitamins et MineralesAntioXidants" (SU.VI.MAX) study is a randomized, double-blind, placebo-controlled primary prevention trial to test the effectiveness of daily supplementation of antioxidant vitamins (vitamin C, 120 mg; vitamin E, 30 mg; and beta-carotene, 6 mg) and minerals (selenium, 100 mcg; and zinc, 20 mg) at nutrient doses (1 to 3 times the recommended daily allowance) in reducing the incidence of serious health problems in industrialized countries, and especially the leading causes of premature death (cancer and cardiovascular disease). The study, conducted in 1994 in France, involved 12,735 people (women, aged 35 to 60 years; men, aged 45 to 60 years). They will be followed for 8 years. The aims and specific design of this intervention study are related to its public health objective. The target population is the general population (not just high-risk patients), and the antioxidants tested are administered at levels that are non-pharmacological and that can be achieved by consuming natural dietary sources of these micronutrients and/or fortified foods. The amounts we are testing in the SU.VI.MAX study are those that have been associated with the lowest risk of disease in observational studies. This report presents the rationale and discusses the validity of the design, doses, and combination of antioxidant micronutrients chosen in the SU.VI.MAX study [4].

Supplementation with vitamin C, vitamin E, or beta-carotene provides no overall benefit in terms of primary prevention of total cancer incidence or mortality. [10] Our results do not provide a compelling case for widespread population-based implementation of high-dose antioxidant supplements for prostate cancer prevention. However, vitamin E supplementation in male smokers and beta-carotene supplementation in men with low dietary beta-carotene intake have been associated with a reduced risk of prostate cancer.[6] Selenium and vitamin E are probably the two most popular dietary supplements that can be used to reduce the risk of prostate cancer. This enthusiasm was reflected in the launch of the Selenium and Vitamin E Chemoprevention Trial. Is there sufficient evidence to support the use of these supplements in a large-scale prospective study for patients who want to reduce their risk of prostate cancer? Results from numerous laboratory and observational studies support the use of these supplements, and data from recent prospective studies also partially support it. However, a closer look at the data reveals some interesting and unique associations. Selenium supplementation was only beneficial for men with lower baseline plasma selenium levels. Other men with normal or higher beta-carotene levels received no benefit and may have an increased risk of prostate cancer. The concept that supplements reduce prostate cancer risk only in those at higher risk and/or those with lower plasma levels of these compounds is supported by studies examining beta-carotene supplements. It is possible that only smokers benefit, as has also been shown with vitamin E supplements. Four recent prospective studies found that vitamin E reduced prostate cancer risk in former/recent and current smokers and in people with low levels of the vitamin. In a previous prospective study, higher doses of vitamin E supplements (> or =100 IU) were also associated with a higher risk of aggressive or fatal prostate cancer in nonsmokers.

The vitamin E dose in the SELECT study (400 IU/day) is 8 times higher than that recommended as effective (50 IU/day) in the largest randomized prospective trial that used prostate cancer incidence. In addition, recent results from all previous prospective randomized trials of cardiovascular disease suggest that vitamin E has little effect on cardiovascular risk, especially at the dose used in the selected study. Other intriguing positive results from past prospective studies of dietary supplements suggest that aspirin and other nonsteroidal anti-inflammatory drugs play an important role in reducing the risk of prostate cancer or other cancers (eg, colon cancer). It may be time for a large, costly trial to re-evaluate the use of selenium and vitamin E supplements to reduce prostate cancer risk. Some evidence for the use of these supplements exists, but severe bias in the study results may lead to inappropriate use of these supplements in clinical settings[11].

Vitamin E supplementation significantly increased the risk of prostate cancer in healthy men[7].

Although the number of cases was small, in this Mediterranean cohort we observed a positive association between sugar-sweetened beverage consumption and breast cancer risk in postmenopausal women.

We found limited evidence for an association between high sugar intake and breast cancer incidence. On the other hand, dairy and soy consumption showed a protective effect in most of the studies reviewed. However, there was considerable heterogeneity in the results. Menopausal status and specific molecular subtypes of breast cancer were the main factors influencing the interpretation of the results. Studies of dietary factors and breast cancer have revealed inconsistencies: high glycemic index in postmenopause may be a risk factor, while sugar-sweetened beverages and artificial sweeteners have given conflicting results; fermented dairy products have shown potential benefit, while non-fermented dairy products have given conflicting results; the effect of soy on breast cancer has varied depending on the molecular subtype, with some studies suggesting a positive association in luminal-like breast cancer. Therefore, further research is crucial to obtain a consensus on the relationship between diet and VSD [9].

Some evidence suggests that a diet rich in vegetables, fruits, and whole grains, with less animal products and refined carbohydrates, is associated with a reduced risk of postmenopausal breast cancer. Data regarding these dietary patterns and premenopausal breast cancer risk point in the same direction, but the evidence is limited because fewer studies have examined premenopausal breast cancer. (Degree: Moderate risk of developing postmenopausal breast cancer, limited risk of developing premenopausal breast cancer) [2].

Material and methods: The aim of our work was to determine the effect of vitamins on cancer cells of different types. The data show that there is much that is unclear in these informative materials. And the need for further study increases with the effect of vitamins on cancer cells.

Results and discussion: The results of our work indicate that vitamins can act on cancer cells positively and negatively. With some intakes of B vitamins, there is a tendency to improve the outcome of the disease, and with some we can see no effect. Some articles talk about the benefits of vitamin D in cancer patients.

Conclusion (findings): With cancer, the level of vitamin D decreases, and it is also possible to determine the stage of the disease by concentration. Taking multivitamins affects survival in cancer patients. Including a lot of articles with undetected results that require further study of vitamins in cancer patients.

Bibliography:

1. Aguilera-Buenosvinos I, Fernandez-Lazaro CI, Romanos-Nanclares A, Gea A, Sánchez-Bayona R, Martín-Moreno JM, Martínez-González MÁ, Toledo E. Dairy Consumption and Incidence of Breast Cancer in the 'Seguimiento Universidad de Navarra' (SUN) Project. Nutrients. 2021 Feb 21;13(2):687. doi: 10.3390/nu13020687. PMID: 33669972; PMCID: PMC7924827.

2. Boushey C, Ard J, Bazzano L, Heymsfield S, Mayer-Davis E, Sabaté J, Snetselaar L, Van Horn L, Schneeman B, English LK, Bates M, Callahan E, Butera G, Terry N, Obbagy J. Dietary Patterns and Breast, Colorectal, Lung, and Prostate Cancer: A Systematic Review [Internet]. Alexandria (VA): USDA Nutrition Evidence Systematic Review; 2020 Jul. PMID: 35129907.
3. Fernandez-Lazaro CI, Martínez-González MÁ, Aguilera-Buenosvinos I, Gea A, Ruiz-Canela M, Romanos-Nanclares A, Toledo E. Dietary Antioxidant Vitamins and Minerals and Breast Cancer Risk: Prospective Results from the SUN Cohort. Antioxidants (Basel). 2021 Feb 24;10(3):340. doi: 10.3390/antiox10030340. PMID: 33668391; PMCID: PMC7996327
4. Hercberg S, Galan P, Preziosi P, Roussel AM, Arnaud J, Richard MJ, Malvy D, Paul-Dauphin A, Briançon S, Favier A. Background and rationale behind the SU.VI.MAX Study, a prevention trial using nutritional doses of a combination of antioxidant vitamins and minerals to reduce cardiovascular diseases and cancers. SUpplementation en VItamines et Minéraux AntioXydants Study. Int J Vitam Nutr Res. 1998;68(1):3-20. PMID: 9503043.
5. Irimie AI, Braicu C, Pasca S, Magdo L, Gulei D, Cojocneanu R, Ciocan C, Olariu A, Coza O, Berindan-Neagoe I. Role of Key Micronutrients from Nutrigenetic and Nutrigenomic Perspectives in Cancer Prevention. Medicina (Kaunas). 2019 Jun 18;55(6):283. doi: 10.3390/medicina55060283. PMID: 31216637; PMCID: PMC6630934.
6. Kirsh VA, Hayes RB, Mayne ST, Chatterjee N, Subar AF, Dixon LB, Albanes D, Andriole GL, Urban DA, Peters U; PLCO Trial. Supplemental and dietary vitamin E, beta-carotene, and vitamin C intakes and prostate cancer risk. J Natl Cancer Inst. 2006 Feb 15;98(4):245-54. doi: 10.1093/jnci/djj050. PMID: 16478743.
7. Klein EA, Thompson IM Jr, Tangen CM, Crowley JJ, Lucia MS, Goodman PJ, Minasian LM, Ford LG, Parnes HL, Gaziano JM, Karp DD, Lieber MM, Walther PJ, Klotz L, Parsons JK, Chin JL, Darke AK, Lippman SM, Goodman GE, Meyskens FL Jr, Baker LH. Vitamin E and the risk of prostate cancer: the Selenium and Vitamin E Cancer Prevention Trial (SELECT). JAMA. 2011 Oct 12;306(14):1549-56. doi: 10.1001/jama.2011.1437. PMID: 21990298; PMCID: PMC4169010.
8. Koçer M, Nazıroğlu M. Effects of 5-fluorouracil on oxidative stress and calcium levels in the blood of patients with newly diagnosed colorectal cancer. Biol Trace Elem Res. 2013 Dec;155(3):327-32. doi: 10.1007/s12011-013-9795-4. Epub 2013 Aug 29. PMID: 23990499.
9. Lalioti A, Verzeletti L, Tiberio P, Gerosa R, Gaudio M, Saltalamacchia G, Pastore M, Zambelli A, Santoro A, De Sanctis R. Common Misconceptions about Diet and Breast Cancer: An Unclear Issue to Dispel. Cancers (Basel). 2024 Jan 11;16(2):306. doi: 10.3390/cancers16020306. PMID: 38254795; PMCID: PMC10814151.
10. Lin J, Cook NR, Albert C, Zaharris E, Gaziano JM, Van Denburgh M, Buring JE, Manson JE. Vitamins C and E and beta carotene supplementation and cancer risk: a randomized controlled trial. J Natl Cancer Inst. 2009 Jan 7;101(1):14-23. doi: 10.1093/jnci/djn438. Epub 2008 Dec 30. PMID: 19116389; PMCID: PMC2615459.
11. Moyad MA. Selenium and vitamin E supplements for prostate cancer: evidence or embellishment? Urology. 2002 Apr;59(4 Suppl 1):9-19. doi: 10.1016/s0090-4295(01)01190-6. PMID: 11937432.
12. Romanos-Nanclares A, Toledo E, Gardeazabal I, Jiménez-Moleón JJ, Martínez-González MA, Gea A. Sugar-sweetened beverage consumption and incidence of breast cancer: the Seguimiento Universidad de Navarra (SUN) Project. Eur J Nutr. 2019 Oct;58(7):2875-2886. doi: 10.1007/s00394-018-1839-2. Epub 2018 Oct 3. PMID: 30284064.
13. Stähelin HB. Critical reappraisal of vitamins and trace minerals in nutritional support of cancer patients. Support Care Cancer. 1993 Nov;1(6):295-7. doi: 10.1007/BF00364966. PMID: 8156246.